

$$a_x = -(15 \text{ m}) \cos(40^\circ)$$

$$b_x = -(19 \text{ m}) \cos(82^\circ)$$

$$+ c_x = (23 \text{ m}) \cos(90^\circ) \rightarrow 0$$

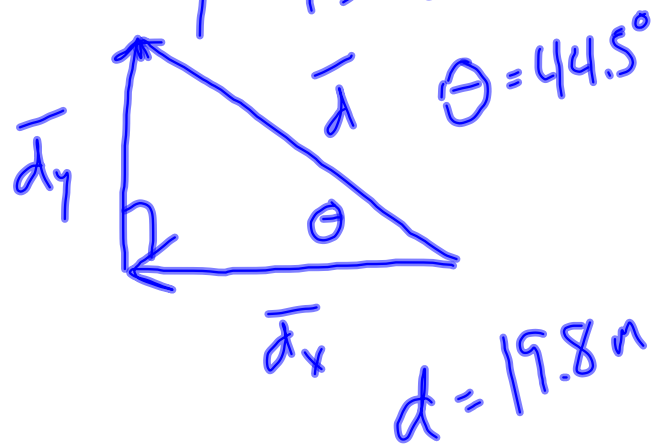
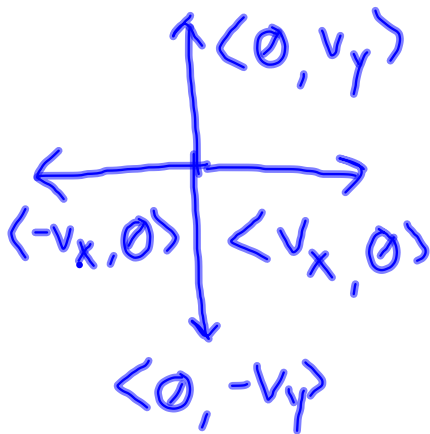
$$d_x = -14.1 \text{ m}$$

$$a_y = (15 \text{ m}) \sin(40^\circ)$$

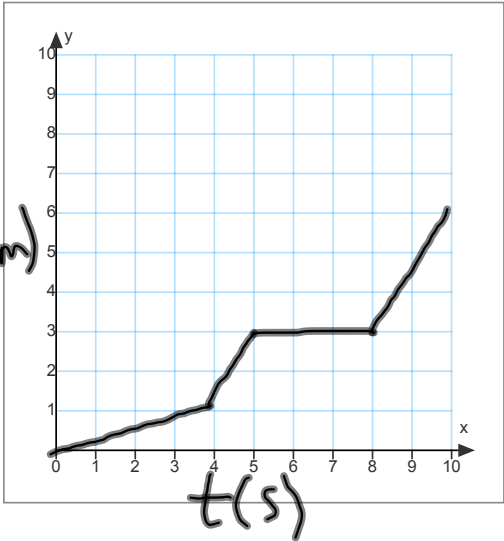
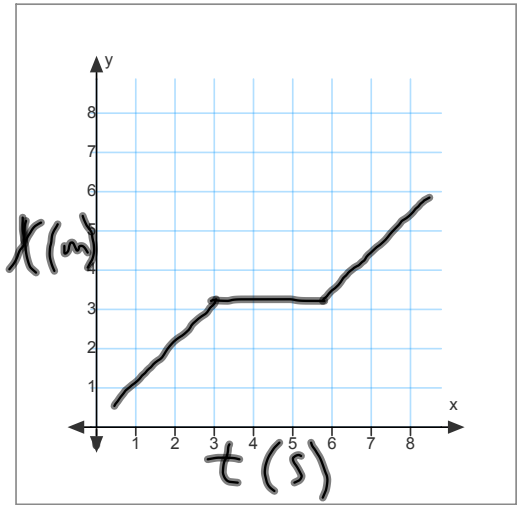
$$b_y = -(19 \text{ m}) \sin(82^\circ)$$

$$+ c_y = (23 \text{ m}) \sin(90^\circ)$$

$$d_y = 13.8 \text{ m}$$



$$\bar{d} = 19.8 \text{ m @ } 44.5^\circ \text{ N of W}$$



- Displacement $\rightarrow x$, unit: m

- Change in displacement \rightarrow

$$\Delta x = x_f - x_i, \text{ unit: m}$$

- We choose zero point

• Velocity

- average velocity $\rightarrow v$, unit: m/s

$$v = \frac{\Delta x}{\Delta t} = \frac{x_f - x_i}{t_f - t_i}$$

- instantaneous velocity:

